Claims

[c1] What is claimed is:

1. A Faraday rotator having wavelength selectivity, for selectively rotating only the polarization plane of incident light of given wavelengths, the Faraday rotator comprising:
a magneto-optical part for rotating the polarization plane of incident light traveling in the direction of said magneto-optical part's magnetic field; and
a dielectric multi-layer film in which a low refractive-index layer and a high refractive-index layer are laminated in alternation, for localizing within said magneto-optical part incident light of at least one wavelength.

[c2] 2. The Faraday rotator set forth in claim 1, wherein said dielectric multi-layer film localizes within said magneto-optical part incident light of plural wavelengths.

[c3] 3. The Faraday rotator set forth in claim 1, wherein said magneto-optical part is constituted from a gadolinium iron garnet thin film.

[c4] 4. The Faraday rotator set forth in claim 1, wherein said dielectric multi-layer film is composed by laminating in alternation silicon oxide as a low refractive-index layer, and titanium oxide as a high refractive index layer.

[c5] 5. The Faraday rotator set forth in claim 1, wherein said magneto-optical part and said dielectric multi-layer film are formed integrally by a vapor-phase process.

[c6] 6. An optical isolator having wavelength selectivity, for selectively blocking return beams from incident light of given wavelengths only, the optical isolator comprising:
a magneto-optical part for rotating the polarization plane of incident light traveling in the direction of said magneto-optical part's magnetic field;
a magnetic part for applying a magnetic field to said magneto-optical part;
a dielectric multi-layer film in which a low refractive-index layer and a high refractive-index layer are laminated in alternation, for localizing within said magneto-optical part incident light of at least one wavelength;

a polarizer for picking out polarized components from incident beams; and an analyzer utilized in combination with said polarizer.

[c7] 7. The optical isolator set forth in claim 6, wherein said dielectric multi-layer film localizes within said magneto-optical part incident light of plural wavelengths.

[c8] 8. The optical isolator set forth in claim 6, wherein said magneto-optical part is constituted from a gadolinium iron garnet thin film.

[c9] 9. The optical isolator set forth in claim 6, wherein said magnetic part is constituted from a gallium-nitride magnetic semiconductor thin film that exhibits ferromagnetism at room temperature and is transparent to light.

[c10] 10. The optical isolator set forth in claim 6, wherein said dielectric multi-layer film is composed by laminating in alternation silicon oxide as a low refractive-index layer, and titanium oxide as a high refractive index layer.

[c11] 11. The optical isolator set forth in claim 6, wherein said polarizer and said analyzer are lent a structure having distributed refractive indices, by irradiating with either a particle beam or an energy beam a diamond-like carbon thin film along a bias with respect to the film's thickness direction.

[c12] 12. The optical isolator set forth in claim 11, wherein said particle beam is an ion beam, an electron beam, a proton beam, α -rays, or a neutron beam; and said energy beam is light rays, X-rays or γ -rays.

[c13] 13. The optical isolator set forth in claim 6, wherein said magneto-optical part, said magnetic part, said dielectric multi-layer film, said polarizer, and said analyzer are formed integrally by a vapor-phase process.

[c14] 14. A polarizer lent a characteristic structure having distributed refractive indices, by irradiating with either a particle beam or an energy beam a diamond-like carbon thin film along a bias with respect to the film's thickness direction.

[c15] 15. The polarizer set forth in claim 14, wherein said particle beam is an ion

beam, an electron beam, a proton beam, α -rays, or a neutron beam; and said energy beam is light rays, X-rays or γ -rays.

[c16] 16. A diamond-like carbon thin film characterized in being transparent in the light region, and in having an extinction coefficient that is 3×10^{-4} or less at optical-communications wavelengths of from 1200 nm to 1700 nm.

[c17] 17. An optics component, characterized by utilizing the diamond-like carbon thin film set forth in claim 16.

[c18] 18. The optical isolator set forth in claim 11, wherein said diamond-like carbon thin film is transparent in the light region, and has an extinction coefficient that is 3×10^{-4} or less at optical-communications wavelengths of from 1200 nm to 1700 nm.

[c19] 19. The optical isolator set forth in claim 12, wherein said diamond-like carbon thin film is transparent in the light region, and has an extinction coefficient that is 3×10^{-4} or less at optical-communications wavelengths of from 1200 nm to 1700 nm.

[c20] 20. The polarizer set forth in claim 14, wherein said diamond-like carbon thin film is transparent in the light region, and has an extinction coefficient that is 3×10^{-4} or less at optical-communications wavelengths of from 1200 nm to 1700 nm.

[c21] 21. The polarizer set forth in claim 15, wherein said diamond-like carbon thin film is transparent in the light region, and has an extinction coefficient that is 3×10^{-4} or less at optical-communications wavelengths of from 1200 nm to 1700 nm.